

STEAM GENERATORS

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| <u>TAC Nos.</u> | <u>Description</u> | <u>Last Update: 06/30/04</u> |
| M88885 | Steam Generator (SG) Integrity Rulemaking | Lead Division: DLPM |
| M99432 | GL: SG Tube Integrity | Supporting Divisions: DE, DIPM, DSSA |
| MA4265 | NEI 97-06 | Supporting Office: RES |
| MA5037 | SG Action Plan | |
| MA5260 | DPO on SG Issues | |
| MA7147 | GSI-163 | |
| MA9881 | Regulatory Issue Summary - IP2 SG Tube Failure | |
| MB0258 | SG Action Plan Administration | |
| MB0553 | SG Inspection Program | |
| MB0576 | Licensee SG Inspection Results Summary Reports & SG Tube Integrity Amendment Review Guidance | |
| MB0631 | SG Workshop | |
| MB0633 | OL No. 803 Revisions per SG Action Plan | |
| MB0737 | IIPB SG Action Plan Activities | |
| MB2446 | SG Risk Communication | |
| MB3794 | SG Communication Plan | |
| MB7216 | SG DPO Followup | |
| MB7842/3 | Catawba Pilot Plant Application (Fee billable, not added to AGAP total) | |
| MC1550 | NEI 97-06 Review | |
| MC2470 | SG Tube Integrity & Associated Technical Specifications | |

| Item No. (TAC No.) | Milestone | Date (T=Target) (C=Complete) | Lead | Support |
|-----------------------|--|------------------------------------|---------------------------------|---|
| 1.1 (MA9881) | Issue Regulatory Information Summary on SG Lessons Learned (TG: 8; page 2 of Ref. 2) | 11/03/00 (C) ML010820457 | DE E. Murphy | |
| 1.2 (MA4265) | Discuss steam generator action plan and IP2 lessons learned with industry and other external stakeholders (TG: 2a-2o, 3a, 3b, 4a, 4b, 4c, 8) | 12/20/00 (C) ML010820457 | DE T. Sullivan R. Rothman | |
| 1.3 (MB0258) | Subsequent to item 2, identify technical and management leads for each item and develop initial resource estimates | 12/27/00 (C) ML010820457 | DLPM R. Ennis | DE K. Karwoski DIPM D. Coe |
| 1.4 (MB0258) | Brief management on resource estimates and invoke PBPM process as appropriate | 12/27/00 (C) ML010820457 | DLPM R. Ennis | DE K. Karwoski DIPM D. Coe |

| Item No. (TAC No.) | Milestone | Date (T=Target) (C=Complete) | Lead | Support |
|-----------------------|---|--|--------------------|--|
| 1.5 (MA5260) | Staff review of ACRS recommendations on DPO and develop detailed milestones and evaluate impact on other action plan milestones. Invoke PBPM process, as appropriate. (GSI-163 and DPO) | 05/11/01 (C) ML011720125 ML011300073 | DLPM R. Ennis | DE S. Coffin E. Murphy DSSA S. Long RES J. Muscara |
| 1.6 (MA7147) | Determine GSI-163 resolution strategy and revise steam generator action plan milestones, as appropriate (GSI-163) | 05/11/01 (C) | DE E. Murphy | |
| 1.7 (MB0553) | Determine need to incorporate new steam generator performance indicators into Reactor Oversight Process (page 2 of Ref. 2; TG: 5e, 5f) | 01/24/01 (C) ML010820457 | DIPM D. Hickman | DE C. Khan E. Murphy DSSA S. Long |
| 1.8 (MA4265) | Recommence work on NEI 97-06 (page 3 of Ref. 2; TG: 7) | 01/31/01 (C) ML010820457 | DE E. Murphy | |
| 1.9 (MB0553) | Review NRC inspection program and, if necessary, revise guidance to inspectors on overseeing facilities with known steam generator tube leakage. (Attachment 3 to Ref. 1) | 03/30/01 (C) ML010920112 | DE L. Lund | DIPM DSSA S. Long |
| 1.10 (MB0576) | Reassess the NRC treatment of licensee steam generator inspection results summary reports and conference calls during outages. Evaluate need for review guidance. (Attachment 3 to Ref. 1; TG: 6c; page 4 and 5 (top and bottom) of Ref. 1) | 04/30/01 (C) ML011220621 ML013020093 | DE S. Coffin | |

| Item No. (TAC No.) | Milestone | Date (T=Target) (C=Complete) | Lead | Support |
|-----------------------|---|--|--|--|
| 1.11 (MB0553) | <p>Review the NRC inspection program and, if necessary, revise guidance to inspectors on overseeing facility eddy current inspection of steam generators. This involves the following major substeps:</p> <p>a) review and revise the baseline inspection program.</p> <p>b.1) review how ISI results/degraded conditions should be assessed for significance by a risk-informed SDP and define needed revisions to the SDP</p> <p>b.2) develop and issue draft revision of risk-informed SDP using information identified in b.1 above</p> <p>c) review and revise the training program for inspectors</p> <p>c.1) Provide IP training material to Regions</p> <p>c.2) Formal training to inspectors</p> <p>(Attachment 3 to Ref. 1; TG: 5a, 5b, 5c, 5d, 5f, 6c)</p> | <p>04/30/01 (C) ML011210293</p> <p>09/21/01 (C) ML012680252</p> <p>02/21/02 (C) ML020730318</p> <p>ML020560366 ML012970361</p> <p>10/11/01 (C)</p> <p>02/01/02 (C)</p> | <p>DE C. Khan</p> <p>DSSA S. Long</p> <p>DIPM P. Koltay</p> <p>DIPM E. Kleeh</p> | <p>DIPM DSSA S. Long</p> <p>DE C. Khan DIPM P. Koltay</p> <p>DSSA S. Long DE C. Khan</p> <p>DE C. Khan</p> |
| 1.12 (MB0576) | Determine need for formal written guidance for technical reviewers to utilize in performing steam generator tube integrity license amendment reviews (TG: 5c, 6a) | 04/30/01 (C) ML011220621 | DE S. Coffin | |
| 1.13 (MB0258) | Staff provides EDO with update on status of action plan (page 8 of Ref. 1) | 05/17/01 (C) ML011720125 | DLPM R. Ennis | |
| 1.14 (MB7842/3) | Staff completes review and issues safety evaluation on pilot plant application (NEI 97-06, TG: 2, 3, 4, 7) | TBD Note 12 | DE E. Murphy | |

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|-----------------------|--|--|---------------------|-----------------|
| 1.15 (MB0631) | Hold steam generator workshop with stakeholders (page 2 of Ref. 1; page 2 of Ref. 2) | 02/27/01 (C) ML010820457 | DE R. Rothman | |
| 1.16 | Staff completes review of generic package and issues model SE for TSTF in <i>FR</i> for public comments (NEI 97-06) | TBD (T) Note 12 | DRIP K. Kavanagh | DE E. Murphy |
| 1.17 | Publish Notice of Availability of TSTF in <i>FR</i> (NEI 97-06) | TBD (T) Note 12 | DRIP K. Kavanagh | |
| 1.18 (MA4265) | Staff briefs the Commission on regulatory framework (NEI 97-06, and WITS Item 199400048) | 05/29/03 (C) | K. Karwoski | |
| 1.19 | Issue generic communication related to steam generator operating experience and status of steam generator issues | 10/31/01 (C) ML020230299 | DE Z. Fu | |
| 1.20 (MA4265) | Staff issues a Commission Paper on regulatory framework (NEI 97-06, and WITS Item 199400048) | 05/16/03 (C) ML023540491 | DE L. Lund | |
| 1.21 (MC2470) | Staff issues a Generic Letter requesting PWR licensees to address adequacy of their technical specifications to ensure tube integrity between inspections and how bending loads are assessed in their tube integrity evaluations | 11/30/04 | DE L. Lund | |
| 2.1 | Evaluate the need for a new communication protocol with the U.S. Secret Service that would cover emergency situations at all NRC licensed facilities (Attachment 3 of Ref. 1) | 12/05/00 (C) ML010460485 ML010820457 | IRO F. Congel | |
| 2.2 (MB0258) | Establish NRC web site for Steam Generator Action Plan | 01/16/01 (C) ML010820457 | DLPM R. Ennis | |

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| 2.3 (MB0258) | Review and revise, as appropriate, the policy for project manager involvement with the morning call between the resident inspectors and the region. (Attachments 3 and 4 of Ref. 1) | 03/23/01 (C) ML011020026 | DLPM R. Ennis | |
| 2.4 (MB0737) | Review program requirements for routine communications between the resident inspectors and local officials based on public interest. Based on weighing current resident inspector responsibilities (e.g., inspection requirements, following up on plant events) against this review, revise program requirements if needed. (Attachment 3 of Ref. 1) | 04/03/01 (C) ML010890426 | DIPM T. D'Angelo | |
| 2.5 (MB0737) | Develop, revise, and implement, as appropriate, a process for the timely dissemination of technical information to inspectors for inclusion in the inspection program (TG: 5g) | 04/03/01 (C) ML010890426 | DIPM G. Klingler | |
| 2.6 (MB2446) (MB3794) | <p>Incorporate experience gained from the IP2 event and the SDP process into planned initiatives on risk communication and outreach to the public (TG: 9)</p> <ol style="list-style-type: none"> 1. Issue NRR input for incorporation into OEDO initiative 2. Address SRM dated 12/26/01 | <p>01/31/02 (C) ML020590125</p> <p>12/24/02 (C) ML023440202</p> | PMAS M. Kotzalas | |
| 2.7 (MB0258) | Investigate possibility of establishing protocol with OIG regarding review of draft reports for factual/contextual errors (page 8 of Ref. 1) | 06/18/01 (C) ML011720125 | DLPM R. Ennis | |
| 2.8 (MB0633) | Review and revise, as appropriate, the amendment review process, including concurrence responsibilities, supervisory oversight, and second-round requests for additional information. | | | |

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| 2.8 (continued) | a. Issue OI LIC-101 b. Issue procedure for NRR and RES interactions (Attachment 3 of Ref. 1; TG: 6b, 6d, 6e; page 6 of Ref. 1) | 08/31/01 (C) 02/27/02 (C) ML020580484 | DLPM M. Banerjee DLPM M. Fields | |
| 3.1 (MB7216) | <p>In order to address ACRS comments on current risk assessments, develop a better understanding of the potential for damage progression of multiple steam generator (SG) tubes due to depressurization of the SGs (e.g., during a main steam line break (MSLB) or other type of secondary side design basis accident). (Pgs. 46, 8-12) (See Notes 4, 5, and 6)</p> <p>Specific tasks include:</p> <p>a) Perform thermal-hydraulic (T-H) calculations and sensitivity studies using the 3-D hydraulic component of TRAC-M to assess the loads on the tube support plate and SG tubes during main steam line break (MSLB). Perform sensitivity studies on code and model parameters including numerics. Develop conservative estimate of loads and evaluate against similar analyses.</p> <p>b) Perform T-H assessment of flow-induced vibrations during MSLB. Using the T-H conditions calculated during the transient, generate a conservative estimate of flow-induced vibration displacement and frequency assuming steady state behavior.</p> | <p>12/31/02 (C) ML023650132</p> <p>12/31/02 (C) ML023650132</p> | <p>RES W. Krotiuk</p> <p>RES W. Krotiuk</p> | <p>DSSA W. Jensen</p> <p>DSSA W. Jensen</p> |

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| 3.1 (continued) | c) Perform additional sensitivity studies as needed. | 06/30/03 (C) | RES W. Krotiuk | SSA W. Jensen |
| | d) Obtain information from existing analyses related to loads and displacements (axial, bending, cyclic) experienced by SG structures under MSLB conditions. | 12/31/02 (C) ML030230822 | RES J. Muscara | |
| | e) Using information from tasks 3.1a, 3.1b, and 3.1d, estimate upper bound loads and displacements. | 12/31/02 (C) ML030230822 | RES J. Muscara | DE E. Murphy |
| | f) Estimate crack growth, if any, for a range of crack types and sizes using bounding loads from task 3.1e in addition to the pressure stresses. Include the effects of TSP movement in these evaluations and any effects from cyclic loads. | 12/31/02 (C) ML030230822 | RES J. Muscara | DE E. Murphy |
| | g) Estimate the margins to crack propagation for a range of crack sizes for MSLB types loads and displacements in addition to the pressure stress. | 12/31/02 (C) ML030230822 | RES J. Muscara | DE E. Murphy |
| | h) Based on the margins calculated in task 3.1g over and above the bounding loads, decide if more refined TH analyses need to be conducted to obtain forces and displacements of structures under MSLB conditions. | 12/31/02 (C) ML030230822 | RES J. Muscara | DE E. Murphy |

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| 3.1 (continued) | l) Conduct tests of degraded tubes under pressure and with axial and bending loads to validate the analytical results from above tasks. | 06/30/03 (C) ML032080002 (Non-public) | RES J. Muscara | DE E. Murphy |
| | j) Conduct analyses similar to above with refined load estimates if necessary. | 06/30/04 (C) | RES J. Muscara | DE E. Murphy |
| | k) Use information developed in tasks 3.1a through 3.1j to evaluate the conditional probabilities of multiple tube failures for appropriate scenarios in risk assessments for SG tube alternate repair criteria (ARC). | 02/28/05 (T) | DSSA S. Long | DE E. Murphy RES J. Muscara H. Woods |
| 3.2 | Confirm that damage progression via jet cutting of adjacent tubes is of low enough probability that it can be neglected in accident analyses. (Pgs. 10-11) (See Notes 3 and 5) Specific tasks include: | | | |
| | a) Complete tests of jet impingement under MSB conditions. | 12/31/01 (C) ML021910311 | RES J. Muscara | DE E. Murphy |
| | b) Conduct long duration tests of jet impingement under severe accident conditions. | 12/31/01 (C) ML021910311 | RES J. Muscara | DE E. Murphy |
| | c) Document results from tasks 3.2a and 3.2b. | 12/31/01 (C) ML021910311 | RES J. Muscara | DE E. Murphy |
| 3.3 (MB7216) | When available, use data from the ARTIST program (planned in Switzerland) to develop a better model of the natural mitigation of the radionuclide release that could occur in the secondary side of the SGs. (Pgs. 12-13) (See Notes 3 and 5) | 09/30/05 (T) See Note 2 | RES R. Lee | DSSA S. Long |

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| 3.4 (MB7216) | <p>In order to address ACRS criticism of current risk assessments, develop a better understanding of RCS conditions and the corresponding component behavior (including tubes) under severe accident conditions in which the RCS remains pressurized. (Pgs. 46-47, 12-15) (See Notes 3 and 5)</p> <p>Specific tasks include:</p> <p>a) Perform system level analyses to assess the impact of plant sequence variations (e.g., pump seal leakage and SG tube leakage).</p> <p>b.1) Re-evaluate existing system level code assumptions and simplifications.</p> <p>b.2) Following the results from 3.4.a and 3.4.b.1, perform additional analysis to: include modeling of heat transfer enhancement from radiation heat transfer in the hot leg and steam generator; suppress unphysical numerically driven flows in the calculations; and investigate the sensitivity of calculated results to bypass flows and other key parameters.</p> <p>c) Examine 1/7 scale data to assess tube to tube temperature variations and estimate variations for plant scale.</p> <p>d) Perform more rigorous uncertainty analyses with system level code to address the uncertainty caused by key governing parameters. Distribution functions will be developed for key parameters. Peer review.</p> | <p>09/28/01 (C) ML012720004</p> <p>04/12/02 (C)</p> <p>04/01/04 (C) ML040910022 (Non-public)</p> <p>08/31/02 (C)</p> <p>03/31/05 (T) Note 13</p> | <p>RES C. Tinkler</p> <p>RES D. Bessett</p> <p>RES C. Boyd</p> <p>RES D. Bessett</p> <p>RES C. Boyd</p> | <p>DSSA W. Jensen S. Long</p> <p>DSSA W. Jensen S. Long</p> <p>DSSA W. Jensen</p> <p>DSSA W. Jensen S. Long</p> <p>DSSA W. Jensen S. Long</p> |

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| 3.4 (continued) | e) Examine SG tube severe accident T-H conditions using computational fluid dynamics (CFD) methods. This includes the following: | | | |
| | e.1) Benchmark CFD methods against 1/7 scale test data. | 08/31/01 (C) NUREG 1781 ML033140399 | RES C. Boyd | DSSA W. Jensen S. Long |
| | e.2) Perform full scale plant calculations (hot leg and SG) for a 4 loop Westinghouse design. Evaluate scale effects. | 03/28/02 (C) NUREG 1788 ML041820075 (Non-public) | RES C. Boyd | DSSA W. Jensen S. Long |
| | e.3) Perform plant analysis to address the effects on inlet plenum mixing resulting from tube leakage and hot leg orientation (CE design impact). | 12/30/02 (C) NUREG 1788 ML041820075 (Non-public) | RES C. Boyd | DSSA W. Jensen S. Long |
| | f) Examine the uncertainty in the T-H conditions associated with core melt progression. | 03/31/05 (T) Note 13 | RES C. Boyd | DSSA W. Jensen S. Long |
| | g) Perform experiments to develop data on inlet plenum mixing impacts due to SG tube leakage and hot leg/ inlet plenum configuration. | 03/31/03 (C) See Note 15 | RES D. Bessett | DSSA W. Jensen S. Long |
| | h) Perform a systematic examination of the alternate vulnerable locations in the RCS that are subject to failure due to severe accident conditions. This includes the following: | | | |
| | h.1) Evaluate the creep failure of primary system passive components such as pressurizer surge line and the hot leg taking into account the material properties of the base metal, welds, and heat affected zones in the presence of residual and applied stresses, in addition to the pressure stress, and the presence of flaws. | 12/31/04 (T) See Note 18 | RES J. Page | DE E. Murphy DSSA S. Long |

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| 3.4 (continued) | h.2) Evaluate the failure of active components such as PORVs, safety valves, and bolted seals based on operability and "weakest link" considerations for these components. | 9/30/04 (T) | RES J. Page | DE E. Murphy DSSA S. Long |
| | h.3) Conduct large scale tests if needed. | 11/30/05 (T) | RES J. Page | DE E. Murphy DSSA S. Long |
| | i) Use existing international data and develop analyses for predicting leak rates of degraded tubes in restricted areas under design basis and severe accident conditions. | 05/28/04 (C) Note 17 | RES J. Muscara | DSSA S. Long DE E. Murphy |
| | j) Put the information developed in task 3.4i into a probability distribution for the rate of tube leakage during severe accident sequences, based on the measured and regulated parameters for ARCs applied to flaws in restricted places (e.g., drilled-hole TSPs and the unexpanded sections of tubes in tube sheets). | TBD (T) Note 17 | DSSA S. Long | DE E. Murphy RES J. Muscara |
| | k) Integrate information provided by tasks 3.4a through 3.4j and 3.5 to address ACRS criticisms of risk assessments for ARCs that go beyond the scope and criteria of GL 95-05 (e.g., ARCs that credit "indications restricted against burst") as well as dealing with other SG tube integrity and licensing issues (e.g., relaxation of SG tube inspection requirements). | TBD (T) Note 17 | DSSA S. Long | DE E. Murphy RES J. Muscara C. Boyd H. Woods |

| Item No. (TAC No.) | Milestone | Date (T=Target) (C=Complete) | Lead | Support |
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| 3.5 (MB7216) | <p>Develop improved methods for assessing the risk associated with SG tubes under accident conditions. (Pgs. 47, 16-20) (See Note 5)</p> <p>Specific tasks include:</p> <p>a) Development of an integrated framework for assessing the risk for the high-temperature/high-pressure accident scenarios of interest.</p> <p>b) Issue report describing improved methods and appropriate treatment of uncertainty for identifying severe accident scenarios that lead to challenges of the reactor coolant pressure boundary.</p> <p>c) Develop logic framework for improved PRA models of the scenarios identified above, including the impact of operator actions.</p> <p>d) Using the 3.5(b) methods and (c) logic framework, identify scenarios, calculate the frequency of containment bypass events at an example plant, make indicated method improvements, and document the improved methods and results.</p> | <p>04/01/02 (C) ML020910624</p> <p>06/28/03 (C) ML031810770</p> <p>04/06/04 (C) ML041400397 (Non-public)</p> <p>12/31/04 (T) See Note 16</p> | <p>RES H. Woods</p> <p>RES H Woods</p> <p>RES H. Woods</p> <p>RES H. Woods</p> | <p>DSSA S. Long</p> <p>DSSA S. Long</p> <p>DSSA S. Long</p> <p>DSSA S. Long</p> |

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| 3.5 (continued) | e) Extend the 3.5(b) methods and (c) model logic to include CE plants, and document them. | 10/30/05 (T) See Note 16 | RES H. Woods | DSSA S. Long |
| | f) Extend the 3.5(b) methods and (c) model logic to include consideration of external events as initiators, and low power and shutdown as initial conditions, and document them. | 10/30/05 (T) See Note 16 | RES H. Woods | DSSA S. Long |
| | g) Extend the 3.5(d), (e), and (f) improved methods and logic to include consideration of core damage sequences initiated by secondary depressurization events (such as MSLB design basis accident scenarios) that induce tube rupture. | TBD See Note 16 | RES H. Woods | DSSA S. Long |
| 3.6 | To address an ACRS report conclusion that improvements can be made over the current use of a constant probability of detection (POD) for flaws in SG tubes, RES has recently completed an eddy current round robin inspection exercise on a SG mock-up as part of NRC's research to independently evaluate and quantify the inservice inspection reliability for SG tubes. This research has produced results that relate the POD to crack size, voltage, and other flaw severity parameters for stress corrosion cracks at different tube locations using industry qualified teams and procedures. Complete analysis of research results and prepare topical report to document the results. (Pgs. 47, 33) | 12/31/01 (C) ML021910311 | RES J. Muscara | DE E. Murphy |
| 3.7 (MB7216) | Assess the need for better leakage correlations as a function of voltage for 7/8" SG tubes. (Pgs. 48, 28-29) (See Note 5) | 04/26/03 (C) ML031150674 | DE J. Tsao | RES J. Muscara |
| 3.8 (MB0258) | Develop a program to monitor the prediction of flaw growth for | 01/03/02 (C) ML020070081 | DE J. Tsao | |

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| 3.9 (MB7216) | <p>Develop a more technically defensible position on the treatment of radio nuclide release to be used in the safety analyses of design basis events. (Pgs. 48, 38-44) (See Note 5)</p> <p>Specific tasks include:</p> <p>a) Assess Adams and Atwood and Adams and Sattison spiking data with respect to the ACRS comments.</p> <p>b) Based upon the assessment performed in task 3.9a, develop a response to the ACRS comments.</p> <p>c) Publish in the <i>Federal Register</i> for public comment, the response to ACRS' comments.</p> <p>d) Complete review of public comments.</p> <p>e) Based upon task 3.9d, determine if additional work needs to be performed.</p> | <p>08/09/01 (C)</p> <p>TBD (T) Note 11</p> <p>TBD (T) Note 11</p> <p>TBD (T) Note 11</p> <p>TBD (T) Note 11</p> | DSSA M. Hart | |
| 3.10 (MB7216) | <p>To address concerns in the ACRS report regarding our current level of understanding of stress corrosion cracking, the limitations of current laboratory data, the difficulties with using the current laboratory data for predicting field experience (crack initiation, crack growth rates), and the notion that crack growth should not be linear with time while voltage growth is, the following tasks will be performed: (Pgs. 20-29) (See last sentence in Note 3)</p> | | | |

Notes:

1. For SG Action Plan milestones associated with the SG DPO (i.e., Item Nos. 3.1 - 3.11), the page numbers referenced in the milestone description indicate the source of the milestone as described in ACRS Report NUREG-1740, "Voltage-Based Alternative Repair Criteria." The ACRS report was included as an enclosure to a memorandum from D. Powers to W. Travers dated February 1, 2001 (Accession No. ML010780125).
2. NRC has entered into an agreement in April 2003 with Paul Scherrer Institute (PSI) of Switzerland, to participate in the ARTIST program. Testing is to commence in 2004 and is scheduled to be complete in 2007. Some preliminary experimental data from the initial phase of testing will be available in 2004.
3. The work described in this milestone is related, in part, to previously planned work associated with an NRR User Need request dated February 8, 2000 (Accession No. ML003682135), and the associated RES response to the request dated September 7, 2000 (Accession No. ML003714399). In addition, portions of this work were undertaken on an anticipatory basis by RES.
4. The work described in this milestone is related, in part, to previously planned work associated with GSI 188, "Steam Generator Tube Leaks/Ruptures Concurrent with Containment Bypass."
5. The work described in this milestone is related, in part, to previously planned work associated with GSI 163, "Multiple Steam Generator Tube Leakage."
6. The thermal-hydraulic analyses (items 3.1a through 3.1c) will provide input into the tube integrity analyses (items 3.1d through 3.1j) on an on-going basis. The end dates for these two areas coincide because of the close integration between these two RES efforts. Also, the end dates reflect the target date for the final report documenting the RES findings.
7. Item Nos. 1.1 through 2.8 in the above table were developed from Attachment 1 of a memorandum from J. Zwolinski, J. Strosnider, B. Boger and G. Holahan to B. Sheron and R. Borchardt dated March 23, 2001 (Accession No. ML010820457). That memorandum provided a revision to the Steam Generator Action Plan that was originally issued via a memorandum from B. Sheron and J. Johnson to S. Collins dated November 16, 2000 (Accession No. ML003770259).
8. Item Nos. 3.1 through 3.11 in the above table were developed from Attachment 1 of a memorandum from S. Collins and A. Thadani to W. Travers dated May 11, 2001 (Accession No. ML011300073). That memorandum provided a revision to the Steam Generator Action Plan as requested by a memorandum from W. Travers to S. Collins and A. Thadani dated March 5, 2001 (Accession No. ML010670217).
9. The completion date assumes need for large scale test.
10. The ADAMS accession no. listed under "Date" is the closure document.
11. The scope of the work is being re-evaluated.

12. The NRC received the steam generator license amendment submittal for a lead plant (Catawba) on February 25, 2003, and the generic submittal as a Technical Specification Task Force (TSTF) Traveler on March 14, 2003. Based on staff comments, the Catawba submittal was revised on July 30, 2003. By letter dated September 9, 2003, the industry submitted a revised TSTF package to be consistent with the July 30, 2003 submittal for Catawba. The staff issued an RAI to Catawba on September 17, 2003. Based on interactions with the licensee on this RAI, the industry embarked on an effort to develop a methodology for plants to use in determining when bending loads are significant and for determining the structural limit for flawed tubes when bending loads are significant.

Since September 2003, the industry has been working on this issue. A meeting with the industry to discuss their results took place on January 21, 2004. The staff also had a meeting with the industry on May 14, 2004, and reached a tentative agreement on the wording of the structural integrity performance criterion. Catawba, the lead plant, currently expects to revise their submittal in July to incorporate the agreed upon wording, and Farley recently submitted a similar TS change request for which they would like approval by September 2004.

The industry is currently developing/documenting a methodology to address the effects of bending on flawed steam generator tubing and the results are expected in October 2004. Plants with newer steam generators, including the pilot plant with 600TT or 690TT tubing (and Farley with 690TT tubing), are expected to have no problem adopting new technical specifications while the industry work is on-going (since the lack of tube cracking in these plants make the effects of bending a non-issue in the near-term). In the meantime, the staff is preparing a generic letter (GL), to be issued in November 2004, that will request licensees (1) to discuss the adequacy of their steam generator tube integrity program and their plans for modifying their technical specifications (TSs) to ensure they are representative of their program in ensuring tube integrity, which should result in licensee's proposing revisions to their TSs that reflect the guidance in NEI 97-06 and (2) to discuss how bending loads are assessed in their evaluations of tube integrity. The licensees that have adopted the new versions of the TS will not be required to respond to the GL.

The staff expects to issue the generic safety evaluation six months after receipt of the final generic submittal (which the staff expects to receive near the completion of the Catawba/Farley reviews).

13. This task has been delayed so that resources could be used to address emerging issues raised by the PRA analysis. In addition, contractor resources have been temporarily prioritized towards completion of more critical time sensitive work.
14. Note 14 no longer exists.
15. This milestone was not performed as evaluation of the cost to perform experiments that would improve upon the Westinghouse experiments showed the cost to be prohibited. CFD analysis provided better information than possible experiments at a very small fraction of the cost. Hence, the objective was satisfied by the completion of milestone 3.4.e.2.
16. Lessons learned from the work completed so far necessitated several modifications and additions to the tasks, milestones, and target completion dates that are being formalized in the RES operating plan and in this SG Action Plan. Scheduled completion date for Item 3.5.g will be provided when the present workscope is expanded.
17. The results from this item feed into the task for calculating the severe accident induced steam generator containment bypass probabilities. New completion dates need to be developed based on scheduled completion of 3.4 and 3.5 milestones.

18. Additional analyses will need to be performed to support the development of a robust probabilistic risk assessment.

Description: Steam generator tube integrity issues continue to arise. As a result, many organizations within the NRC have evaluated portions of the regulatory process associated with steam generator tube integrity and have made some insightful observations and/or recommendations. To ensure safety from a steam generator tube integrity standpoint is maintained, that public confidence in the steam generator tube integrity area is improved, and the NRC and stakeholder resources are effectively and efficiently utilized, the steam generator action plan was developed. The action plan is intended to direct and monitor the NRC's effort in this area and to ensure the issues are appropriately tracked and dispositioned. The action plan is also intended to ensure the NRC's efforts result in an integrated steam generator regulatory framework (license review, inspection and oversight, research, etc.) which is effective, efficient, and realistic.

This plan consolidates numerous activities related to steam generators including: 1) the NRC's review of the industry initiative related to steam generator tube integrity (i.e., NEI 97-06); 2) GSI-163 (Multiple Steam Generator Tube Leakage); 3) the NRC's Indian Point 2 (IP2) Lessons Learned Task Group recommendations; 4) the Office of the Inspector General (OIG) report on the IP2 steam generator tube failure event; and 5) the differing professional opinion (DPO) on steam generator issues. The plan does not address plant-specific reviews or industry proposed modifications to the Generic Letter 95-05 (voltage-based tube repair criteria) methodology. The plan also includes non-steam generator related issues that arose out of recent steam generator related activities (e.g., Emergency Preparedness issues from the OIG report). The milestone table shown above is organized as follows:

- Item Nos. 1.1 through 1.21: SG-related issues (not including the DPO-related issues);
- Item Nos. 2.1 through 2.8: Non-SG related issues; and
- Item Nos. 3.1 through 3.11: DPO-related issues.

Historical Background: The NRC originally planned to develop a rule pertaining to steam generator tube integrity. The proposed rule was to implement a more flexible regulatory framework for steam generator surveillance and maintenance activities that allows a degradation specific management approach. The results of the regulatory analysis suggested that the more optimal regulatory approach was to utilize a generic letter. The NRC staff suggested, and the Commission subsequently approved, a revision to the regulatory approach to utilize a generic letter. In SECY-98-248, the staff recommended to the Commission that the proposed GL be put on hold for 3 months while the staff works with NEI on their NEI 97-06 initiative. In the staff requirements memorandum dated December 21, 1998, the Commission did not object to the staff's recommendation. In late 1998 and 1999 the NRC and industry addressed NRC technical and regulatory concerns with the NEI 97-06 initiative, and on February 4, 2000, NEI submitted the generic licensing change package for NRC review. The generic licensing change package included NEI 97-06, Revision 1, proposed generic technical specifications, and a model technical requirements manual section. SECY-00-0078 outlines the staff's proposed review process associated with the revised steam generator tube integrity regulatory framework described in NEI 97-06. This review process was subsequently revised as described in SECY-03-0080 (see Note 12).

Originating Document: Memorandum from B. Sheron/J. Johnson to S. Collins dated November 16, 2000, "Steam Generator Action Plan" (Accession No. ML003770259).

Regulatory Assessment: The current regulatory framework provides reasonable assurance that operating PWRs are safe. Improvements to the regulatory framework are being pursued through the NEI 97-06 initiative.

Current Status:

- November 1, 2000 Issuance of "Indian Point 2 Steam Generator Tube Failure Lessons-Learned Report" via memorandum from W. Travers to the Commission (Accession No. ML003765272).
- November 3, 2000 Issuance of "Staff Review of OIG Report on the NRC's Response to the Steam Generator Tube Failure at Indian Point 2 and Related Issues" via memorandum from W. Travers to the Commission (Accession No. ML003753067).
- November 16, 2000 Issuance of "Steam Generator Action Plan" via memorandum from B. Sheron/J. Johnson to S. Collins (Accession No. ML003770259).
- February 1, 2001 ACRS Ad Hoc Subcommittee report related to SG DPO issued (NUREG-1740).
- May 11, 2001 Issuance of a memorandum providing a revision to the SG Action Plan to address the issues related to the DPO on SG tube integrity issues (Accession No. ML011300073).
- August 2, 2001 Issuance of a letter to NEI transmitting a draft NRC paper on NEI 97-06 SG generic change package (Accession No. ML012200349).
- September 26, 2001 Staff briefing of ACRS subcommittee on Materials and Metallurgy regarding SG action plan status.
- September 26, 2001 Staff briefing of ACRS Subcommittee on Materials and Metallurgy on SG action plan.
- October 4, 2001 Staff briefing of ACRS full-committee on SG action plan status.
- October 18, 2001 ACRS letter to the Chairman documenting their comment on staff action plan to address the SG DPO (ML012960166).
- November 29, 2001 Staff briefing of ACRS Subcommittee on Materials and Metallurgy on NEI 97-06.
- December 3, 2001 Staff briefing of the Commission on the status of SG action plan.
- December 06, 2001 Staff briefing of ACRS on NEI 97-06.
- September 9, 2002 Issuance of a letter to NEI transmitting staff comments on the draft generic license change package (ML022520413)
- February 25, 2003 Duke Power submits lead plant (Catawba) SG technical specification amendment application.
- March 14, 2003 NEI submits TSTF-449, Revision 0, SG Program Generic License Change Package.
- May 16, 2003 Issuance of SECY-03-0080, "Steam Generator Tube Integrity (SGTI) - Plans for Revising the Associated Regulatory Framework."
- May 29, 2003 Staff briefing of the Commission on the status of SG Regulatory Framework Modifications. An industry briefing preceded the staff briefing.

- September 4, 2003 Public meeting between NRC, Duke Power, and NEI on lead plant submittal.
- February 3-5, 2004 Staff briefing of the joint ACRS Subcommittee on Materials/Metallurgy and Thermal/Hydraulics, and the Full Committee on SG DPO related action items.
- May 21, 2004 ACRS letter to the EDO documenting their comment on staff action plan to address the SG DPO (ML041420237).

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